

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of)	
)	
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BERNHARD SAILER)	
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OTILIE ZELANKO)	
)	
Serial No. 10/509,309)	Group Art Unit: 1794
)	
Filed September 27, 2004)	Examiner: Kreuer, Kevin R.
)	
POLYMERISABLE COMPOSITION)	
)	

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Commissioner for Patents
P.O. Box 1450
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APPELLANT'S BRIEF

Sir:

The following brief is on appeal of a final rejection of Claims 1-4 and 6-8 of the above-identified U.S. patent application. The rejection was contained in an Office Action mailed on April 29, 2009 and a Notice of Appeal was mailed on July 29, 2009. It is respectfully submitted that the Board consider the following arguments and reverse the rejection of Claims 1-4 and 6-8 in the above-identified application.

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Real Party of Interest:

The invention of the present application is assigned to Huntsman Advanced Materials Americas Inc., which is the real party of interest in the present appeal.

Related Appeals and Interferences:

Appellants, and Appellants legal representative, are not aware of any appeals or interferences that directly affect or could be directly affected by or have a bearing on the Board's decision in the present appeal.

Status of the Claims:

Claims 1-16 were presented for examination. Claims 1-4 and 6-16 are pending. Claims 9-16 were withdrawn. Claim 5 was cancelled. Claims 1-4 and 6-8 are the subject of the present appeal and stand rejected by the Examiner.

Status of Amendments:

All amendments were entered prior to the final rejection. No amendments were filed after the mailing of the Office Action.

Summary of Claimed Subject Matter:

There is one independent claim on appeal, Claim 1. Independent Claim 1 is directed to a reaction product comprising a functionalized acrylate polymer.

The limitations of claim 1 include: a reaction product comprising at least a) acrylic acid or methacrylic acid or a mixture of acrylic acid and methacrylic acid (*Application Text*, pg. 2, ll. 13-14) and b) a (meth)acrylic ester of substituted or unsubstituted phenol, C₁-C₈-hydroxyalkylbenzene or C₁-C₈-hydroxyalkoxybenzene and methyl(meth)acrylate in the ratio (percent by weight) of from 7.1:92.9 to 50:50 (*Application Text*, pg. 5, ll. 4-7), 5-90% of the acrylic or methacrylic acid units having reacted with a glycidylvinyl compound (*Application Text*, pg. 2, l. 18) and wherein the ratio (percent by weight) of component a) to component b) is from 80:20 to 20:80 (*Application Text*, pg. 5, l. 10).

Grounds of Rejection to be Reviewed on Appeal

1. Claims 1-4 and 6-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 4,806,450 (hereinafter "Hoffmann et al.") in view of U.S. Pat. No. 5,753,362 (hereinafter "Kawase et al.").

Argument:

1. Claims 1-4 and 6-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hoffmann et al. in view of Kawase et al.

Claims 1-4 and 6-8

A. APPELLANTS CLAIMED REACTION PRODUCT IS PATENTABLE BECAUSE NEITHER HOFFMANN ET AL. NOR KAWASE ET AL. PROVIDE REASON OR MOTIVATION TO MAKE THE CHEMICAL MODIFICATIONS NECESSARY TO ACHIEVE THE CLAIMED REACTION PRODUCT.

The United States Supreme Court has recently addressed the issue of obviousness by stating the *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 86 S. Ct. 684 (1966) factors still control an obviousness inquiry. See *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, (2007). Those factors are: 1) “the scope and content of the prior art”; 2) the “differences between the prior art and the claims”; 3) “the level of ordinary skill in the art”; and 4) objective evidence of nonobviousness. *KSR*, 127 S. Ct. at 1734 (quoting *Graham* 383 U.S. at 17-18). Where claims at issue concern a chemical compound, “it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish prima facie obviousness of the new claimed compound.” *Takeda Chemical Industries, Ltd., v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1357 (Fed. Cir. 2007). In particular, it must be determined that a chemist would have had a reason to attempt to make the claimed compound and a reasonable expectation of success in doing so. See *The Procter & Gamble Co. v. Teva*

Pharmaceuticals USA, Inc. No. 2008-1404, 2008-1405, 2008-1406, 2009 U.S. App. LEXIS 10475 at *8.

In the present case, the Examiner has identified a copolymer taught in Hoffman et al. as the known compound. *See Office Action mailed April 29, 2009* at page 2, l. 22 - page 3, l. 3. The Examiner has noted that Hoffmann et al.'s copolymer does not contain either: a (meth)acrylic ester of unsubstituted phenol, C₁-C₈-hydroxyalkylbenzene or C₁-C₈-hydroxyalkoxybenzene; or methyl(meth)acrylate and the (meth)acrylic ester in the ratio (percent by weight) of from 7.1:92.9 to 50:50 as claimed. The Examiner has reasoned "it would have been obvious to one of ordinary skill in the art at the time the invention was made to polymerize benzyl methacrylate [taught in Kawase] into the [co]polymer taught in Hoffmann et al. in the claimed relative amounts in order to optimize the glass transition temperature of the coating." *Id.* at page 3, ll. 8-11.

- (i) Hoffmann et al. teach away from polymerizing other comonomers into its copolymer that "consists of" specific comonomers at specific amounts

In patent lexicography, the term "consists of" is close ended and conveys limitation and exclusion. *Cias Inc. v. Alliance Gaming Corp.*, 504 F.3d, 1356, 1361 (Fed. Cir. 2007).

Hoffmann et al. consistently emphasize and repeatedly teach a copolymer that "consists of" three specific groups of comonomers at certain amounts. In particular, Hoffmann et al. teach the copolymer consists of (a) from 10-50% by weight of one or more hydroxyalkyl (meth)acrylates; (b) from 8-30% by weight of acrylic acid and/or methacrylic acid; and (c) from 30-80% by weight of one or more alkyl acrylates, alkyl

methacrylates and/or vinyl aromatics as copolymerized units, the sum of the percentages of (a) to (c) being 100, with the proviso that some of the carboxyl groups of the copolymer being esterified by reaction with glycidyl acrylate or glycidyl methacrylate. *U.S. Pat. No., 4,806,450* at col. 2, ll. 24-68. Hoffmann et al. make further reference to limiting the copolymer to only these three groups of comonomers when describing its preparation. *See id.* at col. 3, ll. 41-55. Moreover, Hoffmann et al. teach it is this particular combination of comonomers which provides a copolymer having advantageous and improved properties. *See e.g., id.* at col. 3, ll. 1-5. Finally, Hoffmann et al. provide numerous examples of copolymers polymerized from just the three groups of comonomers described above. *See id.* at col. 4, ll. 28-38 and col. 10, ll. 52-68. It is neither expressly disclosed nor suggested in Hoffmann et al. to polymerize any other comonomer besides those specifically recited. Rather, Hoffmann et al. teach limiting the copolymer to only those comonomers recited and excluding any other comonomer outside of these by consistently using the term “consists of” in relation to its copolymer throughout the publication. Hoffmann et al. thus does not provide any discernible reason for a one skilled in the art to begin with a copolymer only to drop the very feature, a copolymer that “consists of” three specific groups of comonomers, that give the copolymer its advantageous and improved properties. Therefore, it is respectfully submitted that Hoffman et al. teach away from the Examiner’s proposed modification. Withdrawal of the rejection is respectfully requested.

- (ii) Polymerizing Kawase et al.’s benzyl methacrylate in Hoffman et al.’s copolymer to optimize its glass transition temperature is not

adequate support to establish Appellants claimed reaction product as
prima facie obvious

A prima facie case of obviousness exists for a new chemical compound when there is adequate support in the prior art to make specific chemical modifications to a known chemical compound which are necessary to achieve the new compound. *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1363 (Fed. Cir. 2007). The Federal Circuit has confirmed this test is “consistent with legal principles enunciated in *KSR*.” *Id.* at 1356.

For the reasons set forth above, Appellants submit adequate support for the Examiner’s proposed chemical modification to Hoffman et al.’s copolymer is not expressly disclosed or suggested in the teachings of Hoffman et al. Adding Kawase does not remedy Hoffman et al.’s deficiencies.

In particular, Kawase teaches a copolymer polymerized from 0.1-15% by weight of a polymerizable monomer having a functional group, 60-99.9% by weight of a (meth)acrylic acid alkyl ester and 0-39.9% by weight of another monomer, such as benzyl (meth)acrylate. *U.S. Pat. No. 5,753,362* at col. 13, ll. 17-55. Kawase further teaches “[b]y copolymerizing monomers having a phenyl group . . . the glass transition temperature (Tg) of the resulting polymer can be raised . . .” *Id.* at col. 13, ll. 12-15. As described above, the Examiner supports his proposed modification of Hoffman et al.’s copolymer by asserting “it would have been obvious to utilize [Kawase’s benzyl] (meth)acrylate to optimize the glass transition temperature of the [copolymer] taught in Hoffman [et al.] in order to obtain the desired room temperature characteristics and process properties.” *Office Communication Mailed 09/18/2008* at page 4, 2nd paragraph.

Appellants respectfully submit the Examiner's reasoning fails to support a reasonable expectation to one of ordinary skill in the art that performing that chemical change would cause Hoffman et al.'s copolymer to be more easily processable. Rather, the Examiner's proposed modification supports a reasonable expectation that the proposed modification would render Hoffman et al.'s copolymer more difficult to process.

One skilled in the art knows the glass transition is the temperature where a polymer goes from a hard and glass-like state to a soft and flexible-state. According to Kawase, copolymerizing benzyl (meth)acrylate during polymerization raises the glass transition temperature of its resulting copolymer. Thus, based on the teachings provided in Kawase, one would expect that the Examiner's proposed modification would raise the glass transition temperature of Hoffmann et al.'s solid copolymer and render it hard and rigid and inflexible at lower temperatures, for example, room temperature. If one skilled in the art set out to make Hoffman et al.'s copolymer more easily processable (i.e. soft, flexible) at room temperature, he would look for ways to lower the copolymer's glass transition temperature, not raise it. Thus, the Examiner's proposed modification is contrary to what one would reasonably set out to do and expect to achieve in Hoffmann et al.'s copolymer. Accordingly, Appellants respectfully submit the Examiner has failed to provide adequate support for his proposed modification to Hoffman et al.'s copolymer and therefore has not established a prima facie case of obviousness of Appellants new reaction product. Withdrawal of the rejection is respectfully requested.

- (iii) One would not further polymerize Kawase's benzyl (meth)acrylate into Hoffmann et al.'s copolymer since it would render the copolymer unsatisfactory for its intended purpose

When a proposed modification renders the prior art invention being modified unsatisfactory for its intended purpose, there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984).

Hoffmann et al. teach a copolymer consisting of three specific groups of comonomers and its use in a photosensitive recording element. Hoffmann et al. further teach "[t]he limits for the amount of the individual comonomer groups in the copolymers are important with regard to their general properties [of being insoluble in water but soluble or dispersible in aqueous solutions] and especially with regard to the novel photosensitive recording elements produced therefrom." *Id.* at col. 4, ll. 23-27. Because of these properties, the resulting copolymer is taught to provide the photosensitive recording elements after imagewise exposure to actinic light: good developability in aqueous alkaline developers; good resistance to aqueous media; little sensitivity to overwashing during development; and good adhesion to metallic or metal oxide substrates, without deposits of residual layer material in the washed out areas. *Id.* at col. 3, ll. 1-25; col. 9, l. 66 – col. 10, l. 29.


If one were to follow the Examiner's proposed modification to Hoffmann et al.'s copolymer, one would have to further include a comonomer outside of the groups recited and additionally adjust the amounts of the comonomers used during polymerization. However, those of skill in art, when reading Hoffmann et al. as a whole, would have understood Hoffmann et al. to teach that it is the three specific groups of comonomers,

when used at their specific amounts, which provides Hoffmann et al.'s copolymer and its use in the recording element the advantageous and improved properties of alkaline solubility and water insolubility. Furthermore, if one were to further copolymerize Kawase et al.'s benzyl (meth)acrylate into Hoffman et al.'s copolymer, one would expect its alkaline solubility to decrease since the relative amount of groups in the resulting copolymer which could be deprotonated (i.e. methacrylic acid groups) would be less. Therefore, Hoffmann et al., and for that matter Kawase et al., do not provide any discernible reason for one skilled in the art to begin with Hoffmann et al.'s copolymer only to modify it and eliminate the purpose it provides in the recording element. Withdrawal of the rejection is therefore respectfully requested.

In conclusion, for the reasons set forth above, Appellants respectfully request the Board overturn the Examiner's rejections. Should any fee be due in connection with the filing of this document, the Commissioner for Patents is hereby authorized to deduct said fee from Huntsman Corporation Deposit Account No. 08-3442.

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Respectfully Submitted,



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Claims Appendix

Claim 1 (previously presented). A reaction product comprising at least

- a) acrylic acid or methacrylic acid or a mixture of acrylic acid and methacrylic acid and
 - b) a (meth)acrylic ester of substituted or unsubstituted phenol, C₁-C₈-hydroxyalkylbenzene or C₁-C₈-hydroxyalkoxybenzene and methyl(meth)acrylate in the ratio (percent by weight) of from 7.1:92.9 to 50:50,
- 5-90% of the acrylic or methacrylic acid units having reacted with a glycidylvinyl compound and wherein the ratio (percent by weight) of component a) to component b) is from 80:20 to 20:80.

Claim 2 (original). A reaction product according to claim 1, wherein component a) is methacrylic acid.

Claim 3 (original). A reaction product according to claim 1, wherein the (meth)acrylic ester of component b) is benzyl methacrylate.

Claim 4 (original). A reaction product according to claim 1, wherein the glycidylvinyl compound is glycidyl methacrylate.

Claim 5 (cancelled).

Claim 6 (original). A reaction product according to claim 1, wherein the molecular weight of the reaction product is 10000 – 120000 g/mol.

Claim 7 (original). A reaction product according to claim 1, wherein the molecular weight of the reaction product is 20000-90000 g/mol.

Claim 8 (original). A reaction product according to claim 1, which has an acid number of 0.4-5.0 mol/kg, referred to the reaction product.

Claim 9 (withdrawn). A photopolymerizable composition, substantially comprising

- i) a reaction product according to claim 1,
- ii) a monomeric or oligomeric acrylate having at least two ethylenically unsaturated, terminal groups,
- iii) a polymerization initiator or initiator system which produces free radicals, cations or anions and can be activated by actinic radiation and,
- iv) if desired, an organic or inorganic filler.

Claim 10 (withdrawn). A photopolymerizable composition, substantially comprising

- i) a reaction product according to claim 1,
- ii) if desired, a monomeric or oligomeric acrylate having at least two ethylenically unsaturated, terminal groups,
- iii) a polymerization initiator or initiator system which produces free radicals, cations, or anions, and can be activated by actinic radiation,
- iv) if desired, an organic or inorganic filler,
- v) a thermal polymerization inhibitor and
- vi) a solvent or solvent system.

Claim 11 (withdrawn). A photopolymerizable composition, substantially comprising

- i) 15-70% by weight of the reaction product according to claim 1,
- ii) 0-30% by weight of monomeric or oligomeric acrylate having at least two ethylenically unsaturated, terminal groups,

- iii) 0.1-15% by weight of a polymerization initiator or initiator system which produces free radicals, cations or anions and can be activated by actinic radiation,
 - iv) 0-60% by weight of an organic or inorganic filler,
 - v) 0.01-0.5% by weight of a thermal polymerization inhibitor and
 - vi) 20-80% by weight of a solvent or solvent system,
- the percentages of the components being based on the total weight, with the proviso that the sum of the percentages by weight is 100.

Claim 12 (withdrawn). A process for producing an etch resist image or solder resist image, comprising the process steps of:

- I. Application of a photopolymerizable composition according to claim 10 to a substrate;
- II. removal of the solvent from the applied composition with formation of a film of the photopolymerizable composition on the substrate;
- III. if desired, exposure of the coated substrate to actinic radiation;
- IV. if desired, removal of the unexposed parts of the coating with the aid of an alkaline-aqueous or organic solvent with baring of the substrate; and
- V. if desired, thermal curing and, if desired, UV curing of the coating remaining on the substrate.

Claim 13 (withdrawn). A process according to claim 12, wherein the exposure (III) is effected with the aid of a photomask or directly by means of a laser.

Claim 14 (withdrawn). A process for producing an etch resist image or solder resist image, comprising the process steps:

- I. Application of a photopolymerizable composition according to claim 10 to a substrate by means of an inkjet method;
- II. removal of the solvent from the applied composition with formation of a dried photopolymerizable composition on the substrate;
- III. if desired, uniform exposure of the coated or structured substrate to actinic radiation; and
- IV. if desired, thermal curing and, if desired, UV curing of the coating remaining on the substrate.

Claim 15 (withdrawn). A photopolymerizable element comprising a substrate which carries a photopolymerizable layer, substantially comprising

- A) 25-85% by weight of the reaction product according to claim 1,
 - B) 5-40% by weight of monomeric or oligomeric acrylate having at least two ethylenically unsaturated, terminal groups;
 - C) 1-25% by weight of an addition polymerization initiator or initiator system which produces free radicals, cations, or anions and can be activated by actinic radiation;
 - D) 0-60% by weight of an organic or inorganic filler and
 - E) 0.025-1.0% by weight of a thermal polymerization inhibitor;
- the percentages of the components being based on the total weight, with the proviso that the sum of the percentages by weight is 100.

Claims 16 (withdrawn). A photopolymerizable element according to claim 15, wherein the thickness of the photopolymerizable layer is 3-50 μm .

Evidence Appendix:

None

Related Proceeding Appendix:

None